

## Office Memorandum • UNITED STATES GOVERNMENT

TO : The Files - RD-138, Task Order 4

DATE: 31 August 1959

FROM :

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SUBJECT: Trip Report - Hand Crank Generator, HG-3

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1. On 27 August 1959 a trip was made to [redacted] to monitor progress on Contract RD-138, Task Order 4, development of the Hand Crank Generator, HG-3. Present at the discussions were:

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2. During the laboratory evaluation of the HG-3, a failure interrupted the evaluation and the generator had to be sent back to the contractor for repair. The failure consisted of a transistor becoming open due to apparent mechanical shock. The contractor dismantled the transistor and determined that it was open due to mechanical shock because there was no evidence of burning or overloading. After the transistor was replaced, the generator again functioned properly; however, the contractor decided to keep the generator for a few more days in order to make some tests and to correct other deficiencies listed by the R+D Laboratory engineer.

3. The deficiencies which were noted during the evaluation by the Laboratory were discussed and each one studied for corrective measures. The case of the HG-3 was warped and this was due to the fact that this was the first plastic case made and most certainly not sufficient for future models. However, the contractor has received from the case manufacturer a much more sturdy and reliable case which will be used in future models. Also, the molding used to waterproof the case has been improved by making the diameter larger. The contractor also stated that in future models more care would be taken on solder joints, heavier gauge wire would be used, and internal cabling would be lengthened to make servicing easier. Also, a more extensive use of wire color coding will be practiced. The contractor felt that the binding posts which would freeze in the depressed position on the HG-3 were just a set of faulty binding posts, and these posts will be continued to be used unless this discrepancy occurs again.

4. The crank bearing retainer that was used in the original prototype came free from the case during evaluation. This has been corrected in future models by use of the heavier plastic case that will be used, and the contractor feels that this will be sufficient for the hand crank generator. The R+D Laboratory engineer suggested the possibility of

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replacing this type of bearing with a sealed ball bearing instead of the bronze bearing retainer. The contractor said that this could be done but it would mean increasing the size of the case somewhat and the ball bearing would be more expensive. An oiltite bearing will be used in the next model, and should it appear necessary to use a ball bearing, the contractor will make the necessary changes in future prototypes.

5. Some of the other small discrepancies noted during the evaluation, such as the cap screw protruding from the crank handle, and the sharp edges on the crank handle, will be corrected. Also, a ball detent lock will be used to keep the crank from disengaging from the generator during operation. The electronics chassis will be moved further away from the generator windings to prevent a possible shorted winding during assembly, and a locking compound called "lock-tite" will be used on the gear shaft mounting screws to hold them firmly in place.

6. In order to cut down the acoustical noise produced by the generator, the contractor is planning to shock-mount the generator inside the case. These rubber shock mounts will be molded into the plastic case and should cut down the acoustical noise sufficiently to meet the specifications. During the evaluation of the HG-3 the generator produced, at maximum power output, a noise of 64 db, and the specifications call for no more than 50 db noise level. Also during the evaluation, the maximum efficiency obtained was around 49%. The contractor verified this information when he replaced the defective transistor and found that the reduction in efficiency was due to a gear which was using a considerable amount of energy due to friction. This has been corrected and further tests indicated that the efficiency went up to approximately 65%.

7. The contractor is using 8 diodes in the bridge rectifier rather than 4 because the germanium diodes give a lower loss, are less expensive, and are rated at 100 volts at 300 milliamperes. These diodes will not impair the reliability of the Hand Crank Generator. If necessary, silicon diodes could be used, but would be more expensive and would not add to the reliability of the unit.

8. The contractor is now fabricating a third model of the HG-3 which will be submitted in approximately three weeks in order for the R+D Laboratory to complete its evaluation. The contractor feels that it is better to give the R+D Laboratory this third model rather than the one that they were testing because of the much superior plastic case and the deficiencies noted during the evaluation of the second model will be corrected in the third model. If possible,   would like to talk to the R+D Laboratory engineer when he brings this third model of the HG-3

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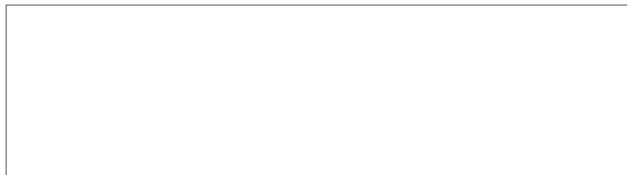
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in order to coordinate the testing of the unit and therefore expedite the evaluation so the final remaining prototypes can be developed.



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cc: R+D Subject File  
R+D Lab  
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